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IS 7603 (1975): Low Speed Food Grinding Machines [ETD 32: Electrical Appliances]



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“Knowledge is such a treasure which cannot be stolen”



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**IS : 7803 - 1975**

***Indian Standard***  
**SPECIFICATION FOR**  
**PORTABLE LOW SPEED FOOD**  
**GRINDING MACHINES**

**( Second Reprint JUNE 1991 )**

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**BUREAU OF INDIAN STANDARDS**  
**MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG**  
**NEW DELHI 110002**

**AMENDMENT NO. 2 MAY 1993**  
**TO**  
**IS 7603 : 1975 SPECIFICATION FOR PORTABLE LOW**  
**SPEED FOOD GRINDING MACHINES**

[ *First cover, Pages 1 and 3 title ( see also Amendment No. 1)* ] — Substitute the following for the existing title:

**‘Indian Standard**  
**SPECIFICATION FOR LOW SPEED FOOD**  
**GRINDING MACHINES’**

( *Page 4, clause 2.1* ) — Delete the word ‘portable’ from the first line.

( ETD 32 )

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Reprography Unit, BIS, New Delhi, India

**AMENDMENT NO. 3 JULY 2000**  
**TO**  
**IS 7603 : 1975 SPECIFICATION FOR LOW SPEED**  
**FOOD GRINDING MACHINES**

( *General* ) — Substitute 'IS 302-2-209 ( 1994 ) Safety of household and similar electrical appliances: Part 2 Particular requirements, Section 209 Portable low speed food grinding machines' for 'IS 302-1973 General and safety requirements of household and similar electrical appliances ( *first revision* )', wherever appears in the standard.

( ETD 32 )

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Reprography Unit, BIS, New Delhi, India

# Indian Standard

## SPECIFICATION FOR PORTABLE LOW SPEED FOOD GRINDING MACHINES

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(Continued on page 2)

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## IS : 7603 - 1975

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# *Indian Standard*

## SPECIFICATION FOR PORTABLE LOW SPEED FOOD GRINDING MACHINES

### 0. FOREWORD

**0.1** This Indian Standard was adopted by the Indian Standards Institution on 5 February 1975, after the draft finalized by the Electrical Appliances Sectional Committee had been approved by the Electrotechnical Division Council.

**0.2** Grinding machines are employed to pulverize or powder dry foodstuffs, or to convert them into slurries or pulps in the presence of water or oil or both. This standard covers the general, safety and performance requirements of low speed food grinding machines to ensure personal safety against electric shock, safety against the effects of excessive temperature and fire, and to ensure reliable operation.

**0.3** The Indian Standard, IS : 302-1973\* to which references have been made in this standard with regard to general and safety requirements as well as method of tests, is a necessary adjunct to this standard. Should, however, any deviation exist between the requirements of IS : 302-1973\* and those of this standard, the provisions of the latter shall apply.

**0.4** For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS : 2-1960†. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

### 1. SCOPE

**1.1** This standard applies to electric motor driven low speed food grinding machines mainly intended for domestic and similar use.

**1.2** It does not apply to high speed food mixers provided with blades and cutters which are covered by IS : 4250-1967‡.

\*General and safety requirements for household and similar electrical appliances (*fourth revision*).

†Rules for rounding off numerical values (*revised*).

‡Specification for domestic electric food-mixers (liquidizers, blenders and grinders).

## **2. TERMINOLOGY**

**2.0** For the purpose of this standard, the following definitions, in addition to relevant definitions given in IS : 302-1973\*, shall apply.

**2.1 Grinder** — A portable appliance which by operation of low speed abrasive friction surfaces or by compression surfaces is intended primarily for pulverizing or powdering dry foodstuffs, either raw or roasted, such as cereals, grains, coffee seeds, etc, and/or converting them in the presence of water or oil, into forms of slurries or pulps.

**2.2 Speed** — The revolutions of the part of the appliance, where actual change of the foodstuff takes place.

**2.3 Abrasive Friction Surface** — Any surface that has a relative motion and in close contact with another stationary surface, having a high coefficient of friction.

**2.4 Hopper** — Container part of the grinder where food is inserted and finds its way to the grinding mechanism during the operation.

**2.5 Spout** — That part of the grinder where the ground material flows out of the unit.

## **3. RATING**

**3.1 Rated Voltage** — The provisions of 3.1 of IS : 302-1973\* shall apply.

**3.2 Rated Input** — The rated input shall not exceed 1 000 watts.

**3.3 Rated Capacity** — The rated capacity shall be the maximum specified quantity handled by the unit for each complete cycle of operation. This may be specified as the hopper capacity.

**3.3.1** Preferred capacities per loading shall be 50, 75, 100, 300, 500 ml and 1 litre.

**3.4 Rated Duty Period** — The duration to which the grinder is designed to work continuously under rated load and under conditions of adequate heat discharge, without excessive heating up shall be not less than 15 minutes or the time taken for grinding the maximum specified quantity of the most adverse material whichever is greater.

**3.5 Rated Frequency** — Where the grinder is designed to work purely on ac circuit, the rated frequency shall be 50 Hz.

**3.6 Rated Speed** — The rated speed of the grinder shall not exceed 500 rev/min and the surface velocity shall not exceed 300 m/min.

## **4. COMPONENT PARTS AND MATERIALS**

**4.1** The provisions given in 5, 7.11 and 7.12 of IS : 302-1973\* shall apply in addition to 4.2 to 4.4.

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\*General and safety requirements for household and similar electrical appliances (fourth revision).

**4.2** Materials used in the grinder shall be non-flammable and corrosion resistant.

**4.3** Material of the grinding wheel shall be such that it shall not react with the foodstuff and shall not contaminate with the same and the grinding wheel shall not be appreciably ground by the food material after endurance test ( *see 11.3.9* ).

**4.4** Parts which would come in contact with foodstuff shall be made of cast iron, cast aluminium, sheet metal or high impact heat resisting plastic of adequate strength in case of dry grinding and for wet grinding the same shall be made of stainless steel or aluminium or plastic with high-impact heat resisting properties.

## **5. DESIGN**

**5.1** Provisions of 6 of IS : 302-1973\* shall apply.

## **6. CONSTRUCTION**

**6.1** The requirements specified in 6.2 to 6.11 in addition to other relevant provisions given in 7 of IS : 302-1973\* shall apply.

**6.2** All parts required to be cleaned and kept in a hygienic condition shall be readily accessible without the use of special tools.

**6.3** All castings and other materials required to be handled shall be smooth, round edged and free from blow holes, pits, foreign matter and surface imperfections.

**6.4** Machined and formed parts shall be made to ensure complete interchangeability and parts subject to wear shall be easily replaceable.

**6.5** A lid shall be provided to the hopper to avoid spillage or splutter of grains during the grinding.

**6.6** Means shall be provided to adjust the ground grain size or slurry consistency without the use of tools. This adjustment shall stay firm for each setting, and shall not work loose due to vibrations or heating.

**6.7** Means shall be provided to inspect the ground food, at the outlet spout without any necessity for stopping the machine.

**6.8** Means shall be provided for easy collection of ground products.

**6.9** Shafts of the grinding wheels and other associated parts shall be suitably constructed to ensure against the ingress of liquids, oils, fats or particles of food grains, so as not to impair the performance of the machine.

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\*General and safety requirements for household and similar electrical appliances (fourth revision ).

## **IS : 7603 - 1975**

**6.10** The design shall ensure that no accidental bodily contact is made with grinder or its mechanism such as intake-screws while they are in the operation.

**6.11** The design shall ensure that lubrications and abrasive materials do not contaminate the food while it is being processed. Grinding surfaces shall be corrosion and rust resisting.

### **7. SPECIFIC REQUIREMENTS FOR DIFFERENT PARTS OF THE GRINDERS**

**7.1 Ventilating Openings** — Openings for ventilation of the motor shall be properly screened, generally to prevent entry of water, dirt or vermin.

**7.2 Electric Motor** — The motor shall conform to the requirements of IS : 996-1964\* and IS : 325-1970†. It may be provided with a facility to operate at more than one speed.

**7.3 Controls** — Switches and controls shall conform to the relevant provisions of IS : 7153-1973‡. They may also have stable positions of operation at various speeds.

**7.4 Hopper** — The hopper shall have a means for shutting off or opening the flow of grains into the grinder mechanism. The hopper may be designed to be easily removable from the machine and shall be free from cracks, pits and crevices. The inner sides shall be smooth and shall not have corners or niches so that cleaning is facilitated. The fixing arrangement of the hopper shall be adequately strong to stand repeated operations. It may be fitted with handling grips. When the hopper, if detachable, is fitted on the grinder, it shall be leak-proof.

**7.5 Speed of Grinding Surface** — The speed of the grinding surface shall not exceed 300 m/min on full load condition on the highest speed position of switch nor shall be less than 150 m/min on the lowest position of the switch.

**NOTE** — The speed of the surface is measured where it offers the maximum velocity, even if such a surface does not actually perform grinding operation, but constitute a part of the grinding surface.

### **8. GENERAL AND SAFETY REQUIREMENTS**

**8.1 Protection Against Electric Shock** — The provisions given in 8 of IS : 302-1973§ shall apply.

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\*Specification for single-phase small ac and universal electric motors (*revised*).

†Specification for three-phase induction motors (*third revision*).

‡Specification for electric controls for household appliances.

§General and safety requirements for household and similar electrical appliances (*fourth revision*).

## **8.2 Temperature-Rise**

**8.2.1** The temperature limits specified in Table 1 of IS : 302-1973\* shall apply in addition to 8.2.2.

**8.2.2** The temperature-rise of the external surface of the grinder shall not exceed by more than 15°C above the ambient, under conditions of normal loading and adequate heat discharge.

**8.3 Electrical Insulation** — The provisions given in 11 of IS : 302-1973\* shall apply.

**8.4 Spillage** — The provisions given in 12 of IS : 302-1973\* shall apply.

**8.5 Moisture Resistance** — The provisions given in 13 of IS : 302-1973\* shall apply.

**8.6 Mechanical Hazards and Stability** — The provisions given in 14 of IS : 302-1973\* shall apply.

**8.7 Mechanical Strength** — The provisions given in 15 of IS : 302-1973\* shall apply.

**8.8 Abnormal Operation** — The provisions given in 16 of IS : 302-1973\* shall apply.

**8.9 Thermal Cutouts** — Thermal cutouts, if provided, shall comply with the provisions given in 17 of IS : 302-1973\*.

**8.10 Operation Under Overload Conditions** — The provisions given in 18 of IS : 302-1973\* shall apply.

**8.11 Starting** — The relevant provisions given in 18.2 of IS : 302-1973\* shall apply.

**8.12 Endurance** — The provisions given in 19 of IS : 302-1973\* shall apply.

**8.13 Supply Connections** — The provisions given in 20 of IS : 302-1973\* shall apply.

**8.14 Terminals** — The provisions given in 21 of IS : 302-1973\* shall apply.

**8.15 Earthing** — The provisions given in 22 of IS : 302-1973\* shall apply.

**8.16 Screws and Connections** — The provisions given in 23 of IS : 302-1973\* shall apply.

**8.17 Creepage Distances and Clearances** — The provisions given in 24 of IS : 302-1973\* shall apply.

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\*General and safety requirements for household and similar electrical appliances (fourth revision).

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**8.18 Resistance to Rusting** — The relevant provisions given in 7.33 of IS : 302-1973\* shall apply.

**8.19 Finish** — The external finish used on all metal components shall be of a heat, moisture and acid resisting nature and shall not be adversely affected by variations in temperature occurring under normal operating conditions or during the endurance test.

## **9. PERFORMANCE REQUIREMENTS**

**9.1** The input when measured in accordance with 11.3.6 shall not differ from the rated input by more than  $\pm 15$  percent or 45 watts whichever is higher.

## **10. MARKING AND INSTRUCTIONS FOR USE**


**10.1** Each appliance shall be marked indelibly and clearly with the information specified in 25.1 of IS : 302-1973\*.

**10.1.1** The appliance may also be marked with the ISI Certification Mark.

**NOTE** — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution ( Certification Marks ) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard, under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions, under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

**10.2 Marking of Control Switch** — The 'on' or 'off' or both positions of the control shall be clearly marked. If any speed control device is provided, the various positions shall be clearly and indelibly marked.

**10.3 Marking of Grinding Control** — Various positions of the grinding adjustment lever or control shall be clearly and indelibly marked to indicate the consistency expected in each position. The positions shall have a direct relation to the ground product size in terms of millimetres and microns sieve designations in IS : 460-1962†.

**10.4 Marking of Earth Terminal** — The symbol '  ' shall be marked permanently on or adjacent to the earth terminal, if provided. When coloured wires are used green colour shall be used for earthing wire.

**10.5 Instructions for Use** — Each grinder shall be provided with

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\*General and safety requirements for household and similar electrical appliances ( fourth revision ).

†Specification for test sieves ( revised ).

necessary instructions for use which will include among other informations the following:

a) *Precautions*

- 1) While positioning of the grinder, and
- 2) Before switching on the machine.

b) *Warning*

- 1) About the parts of the grinder which shall not be brought into contact with liquids, and
- 2) About the parts which may prove dangerous when in motion.

c) *Instruction*

- 1) For assembling and dismantling the hopper and other associated parts, cleaning procedure, and servicing;
  - 2) For type of supply to which the grinder is to be connected and instructions for electrical connections; and
  - 3) For keeping the grinder cleaned and dried when not in use.
- d) Directions during abnormal operations or when the grinder is locked up.
- e) Nominal maximum duration of working the grinder at various settings.
- f) Guide for loading, indicating maximum quantity of at least three types of heavy and three types of light grains, ideal settings for desired grinding and in case of multispeed units, the ideal speed position of the control.
- g) Availability of spares and service.

## 11. TESTS

**11.1 General Conditions for Tests** — Unless otherwise specified in the relevant clauses, the conditions specified in 26 of IS : 302-1973\* shall apply.

### 11.2 Categories of Tests

**11.2.1 Type Tests** — The tests specified in Table 1 shall constitute type tests and shall be carried out on 5 samples of the same model, type and ratings (selected preferably at random from a regular production lot). The type tests shall be carried out in the same sequence in which they appear in Table 1.

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\*General and safety requirements for household and similar electrical appliances (*fourth revision*).

**TABLE 1 SCHEDULE OF TESTS**

( Clause 11.2.1 )

Sl. No.	TEST	CLAUSe REFERENCE
1.	Visual examination and inspection	11.3.1
2.	Finish	39 of IS : 302-1973*
3.	Strength of assembly	11.3.2
4.	Fire resistance	29
5.	Stability and mechanical hazards	32.1
6.	Cord grip	33.2
7.	Screws and connections	35.1
8.	Mechanical strength	36
9.	Spillage ( for wet grinder )	11.3.3
10.	Temperature withstand ( for plastic and glass hoppers only )	11.3.4
11.	Resistance to rusting	37
12.	Protection against electric shock	40
13.	Leakage current	42.1 and 42.2
14.	High voltage	42.3
15.	Insulation resistance ( dry )	44.3
16.	Earthing connection	38
17.	Moisture resistance	43
18.	Speed controls and switches	11.3.5
19.	Creepage distances and clearances	48
20.	Performance of thermal cutout ( if provided )	49
21.	Starting	51
22.	Input	11.3.6
23.	Temperature-rise	11.3.7
24.	Operation and performance	11.3.10
25.	Operation under overload condition	50 of IS : 302-1973*
26.	Endurance	11.3.8
27.	Abnormal operation	11.3.9

\*General and safety requirements for household and similar electrical appliances ( fourth revision ).

**11.2.1.1 Criteria of acceptance** — The provisions contained in 27.1.1 of IS : 302-1973\* shall apply.

**11.2.2 Acceptance Tests** — The tests specified in Table 2 shall constitute acceptance tests.

\*General and safety requirements for household and similar electrical appliances ( fourth revision ).



AMENDMENT NO. 1    JUNE 1977  
TO  
IS:7603-1975 SPECIFICATION FOR  
PORTABLE LOW SPEED FOOD GRINDING MACHINES

Alterations

(Page 11)

a) Table 2, Sl No. 2 - Delete the entry and renumber the subsequent entries accordingly.

b) Table 3, Sl No. 7 - Delete the entry.

(Page 12, clause 11.3.1) - Substitute the following for the existing clause:

*'11.3.1 Visual Examination and Inspection*

11.3.1.1 The food grinding machines shall be visually examined and inspected for obvious visual defects in respect of components, parts and their assembly, construction, stability, marking, provision of suitable terminals for supply connections, earthing and the effectiveness of screws and connections.

11.3.1.2 The supply connections shall be of size appropriate to the rating (See 20 of IS:302-1973\*).

11.3.1.3 The external surface finish shall be even and free from finishing defects.'

(Page 16, clause 11.3.10.2, last para, line 2) - Substitute '1.4-mm sieve' for '1.5-mm sieve.'

(ETDC 43)

TABLE 2 ACCEPTANCE TESTS

( Clause 11.2.2 )

Sl. No.	TEST	CLAUSe REFERENCE
1.	Visual examination and inspection	11.3.1
2.	Finish	39 of IS : 302-1973*
3.	Spillage ( for wet grinder )	11.3.2
4.	Temperature withstand ( for plastic and glass hoppers only )	11.3.4
5.	Protection against electric shock	40
6.	Leakage current	42.1 and 42.2
7.	High voltage	42.3
8.	Insulation resistance ( dry ,	44.3
9.	Earthing connection	38
10.	Moisture resistance	43
11.	Input	11.3.6
12.	Temperature-rise	11.3.7
13.	Operation and performance	11.3.10

\*General and safety requirements for household and similar electrical appliances  
( fourth revision )

11.2.2.1 Sampling procedure for acceptance tests shall be as specified in Appendix C of IS : 302-1973\*.

11.2.3 Routine Tests — The tests specified in Table 3 shall constitute routine tests.

TABLE 3 ROUTINE TESTS

Sl. No.	TEST	CLAUSe REFERENCE
1.	Visual examination and inspection	11.3.1
2.	Protection against electric shock	40
3.	High voltage	42.3
4.	Insulation resistance ( dry )	44.3
5.	Earthing connection	38
6.	Input	11.3.6
7.	Operation and performance	11.3.10

\*General and safety requirements for household and similar electrical appliances  
( fourth revision )

\*General and safety requirements for household and similar electrical appliances  
( fourth revision )

### **11.3 Schedule of Tests**

**11.3.1 Visual Examination and Inspection** — The grinder shall be visually examined and inspected for conformity with various relevant requirements as specified in 3, 4, 5, 6 and 7 of this standard.

**11.3.2 Strength of Assembly** — The hopper, if detachable, shall be assembled and mounted on grinder assembly for six times under the following controlled conditions:

- a) Press-fit joints using a force of 245 N, and
- b) Screws and screwed-on joints, using a screwing torque of 2.45 Nm.

There shall be no chipping, cracking or visible dents or scratches on the mating surfaces.

#### **11.3.3 Spillage (for Wet Grinder Only)**

**11.3.3.1** The output or the spout shall be temporarily blocked for the purpose of this test; the hopper shall be assembled and water shall be poured slowly over a period of one minute into the grinder through the hopper, to fill it entirely, taking care not to spill water over the sides or on the grinder. The grinder shall be allowed to stand in this condition for a period of 15 minutes. At the end of this period the grinder shall be examined for any visible signs of leakage or any drop in the level of water in the hopper. If there is drop in the level measured, a quantity of water is again poured into the hopper slowly to bring the level to original. The entire quantity of water is now drained out of the grinder and then measured. Leakage of water in this test shall not be more than 2 percent of the total quantity of water content.

**11.3.3.2** The grinder is once again filled as above and 20 percent more water (total quantity) is made to spill over the hopper over a period of 1 minute.

**11.3.3.3** The machine shall then withstand the tests specified in last two paragraphs of 46.1 of IS : 302-1973\*.

**11.3.4 Temperature Withstand Test (for Plastic and Glass Hoppers Only)** — Glass hoppers will be tested without assembling them on grinders. The emit port is closed by artificial means, and held in the position of normal use. Boiling water is poured into this hopper to fill it to its brim over a period of half a minute.

**11.3.4.1** After this test the hopper is emptied and brought back to room temperature within 5 minutes by forced air-cooling.

**11.3.4.2** The above test shall be repeated 5 times. At the end of the test the hopper shall not show any sign of cracks.

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\*General and safety requirements for household and similar electrical appliances (fourth revision).

### 11.3.5 *Speed Controls and Switches*

**11.3.5.1 Test for switches** — Control switches shall be capable of breaking the stalled motor current at the maximum rated voltage 10 times without failure. This test shall be carried out on dc unless the machine is marked exclusively for ac.

**11.3.5.2 Speed regulators** — Under normal load, at each setting the speed when checked shall not vary by more than  $\pm 10$  percent of the marked speed at that setting.

**11.3.6 Test for Input** — The input shall be measured with the grinder connected to a supply circuit at maximum rated voltage and at rated frequency (for ac machine), under conditions of maximum normal loading and adequate heat discharge, as specified in 11.3.7.

**11.3.6.1** The input when measured in accordance with 11.3.6 shall not differ from the rated input by more than 15 percent or 45 watts whichever is higher.

**11.3.7 Temperature-Rise** — The grinder shall be operated under conditions of normal loading, while connected to a supply circuit at maximum rated voltage. To obtain normal loading conditions the hopper shall be filled to 70 percent of its rated capacity with a lubricating oil or mixture of oils whose flash point exceeds 650°C and of such viscosity as to give consistently the maximum deflection of the wattmeters and shall be operated at the setting of the grinder control which gives the lowest grinding size. The test shall be conducted over one complete duty period. Initially the spout is kept closed. After the machine is started the spout is kept open. The hopper is continuously kept filled to the same capacity with an external oil supply and at room temperature.

**11.3.7.1** The temperature of any material or insulation which may be exposed to excessive temperature during the operation shall be measured, by change of resistance or thermocouple method. The appliance shall be rejected if the temperature-rise, so determined over an ambient temperature not exceeding 40°C, exceeds the temperature permissible according to Table 3 of IS : 302-1973\*.

**11.3.7.2** The condition specified in 8.2.2 shall be satisfied.

**11.3.7.3** Thermal cutouts and overload protectors shall not operate during the test.

**11.3.8 Endurance Test** — The test shall be carried in accordance with 52.2 of IS : 302-1973\* except that the operating period shall be 96 hours instead of 48 hours specified in 52.3 of IS : 302-1973\*. During the period of test the grinder shall be fed with the material specified in 11.3.10.1 for dry grinder and 11.3.10.2 for wet grinder. In case of grinder meant for

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\*General and safety requirements for household and similar electrical appliances (fourth revision).

both wet and dry grinding the test specified in 52.3 of IS : 302-1973\* shall be conducted first for 48 hours with material specified in 11.3.10.1 and for the next 48 hours with material specified in 11.3.10.2.

In addition to complying with 52.7 of IS : 302-1973\*, after the endurance test, the grinding surfaces shall not deteriorate. This requirement is considered to be satisfied if the grinder successfully passes the test as specified in 11.3.10.

**11.3.9 Abnormal Operation** — The tests shall be carried out according to 47.7 and 47.9 of IS : 302-1973\*. The loading conditions shall be those of 11.3.7.

**11.3.10 Operational and Performance Tests with Recipes** — The following operational tests shall be performed with the grinder connected in a circuit with a wattmeter and supplied with the rated voltage. Before each test the grinder shall be kept at a temperature not exceeding 40°C. It shall be operated continuously (or intermittently as specified in the manufacturers instruction), until the required result of grinding is obtained or until the time limit indicated in each test is reached whichever is earlier. The total time of actual operation of the machine in each test shall be noted and recorded from a stop-watch or similar device. When the operation is intermittent, each period of operation during the test shall be equal to the minimum specified.

The tests specified in 11.3.10.1 and 11.3.10.2 are applicable to dry grinder and wet grinder respectively. For a grinder meant for both dry and wet grinding both the tests shall be performed.

**11.3.10.1 Grinding coffee** — Freshly roasted coffee seeds corresponding to the grading 'Light roast' of IS : 3077-1965† shall be used for this test. The weight of seeds in grains shall correspond to 40 percent of the rated capacity in millilitres of the grinder hopper under test. The grinding size control lever is set at the point corresponding to 355 microns.

The seeds are continuously fed up to the marked level of the hopper and the pulverized contents are collected in container, until all the quantity specified in the above paragraph passes through the grinding machine. The machine is run for one minute after the last seed vanishes through the hopper.

The machine may be gently tapped a few times to loosen any material sticking inside.

The load on the grinder is carefully observed during the test. If the grinder appears to be loaded more than the rated input, the grinding control is placed to a slightly higher size setting.

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\*General and safety requirements for household and similar electrical appliances (fourth revision).

†Specification for roasted and ground coffee.

The time required for grinding one batch of seed shall be recorded and this operational time shall not exceed 4 minutes and the total time including periods of rest shall not exceed 6 minutes.

**NOTE** — If necessary, the above test may be repeated until a consistent result is obtained.

The ground powder shall be weighed and this weight shall not be less than 95 percent of the weight of seeds taken for grinding.

The result of grinding shall be assessed by sieving successively through the following Indian Standard sieves:

710, 500 and 355 microns

The method of sieving indicated in Appendix D of IS : 3077-1965\* shall be used. The material retained on each of the first two sieves shall not be more than 10 percent of the weight obtained after the test. The material passing through the third sieve shall be not less than 50 percent of the same weight.

**11.3.10.2 IDLI batter** — The general procedure for preparing the *IDLI* batter is to take decuticled blackgram ( *URAD DAL* ) and parboiled rice in the proportions of 1 : 2 by weight to soak them separately in the required quantity of water for 6 hours at temperature not exceeding 40°C and then to grind them separately before mixing them together. The blackgram is ground to be smooth and frothy and the rice is ground to a fine semolina in water.

For the purpose of this test the solid ingredients are taken from (i), (ii), or (iii) of the weight specified below and soaked in the quantity of water shown against each weight of solid. The soaked solid with unabsorbed water shall then be transferred to the hopper continuously and ground:

<i>Blackgram</i>		<i>Parboiled Rice</i>	
Weight	Quantity of Water	Weight	Quantity of Water
g	ml	g	ml
i) 100	255	200	225
ii) 200	450	400	450
iii) 300	675	600	675

The maximum operational time for grinding the blackgram and rice shall be 4 minutes and 8 minutes respectively and the maximum total time

\*Specification for roasted and ground coffee.

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including period of rest for grinding each ingredient shall be 10 minutes. The grinding size control lever shall be set at the point corresponding to 500 microns.

The results of grinding the blackgram are assessed by working the mix between the thumb and fingers. The mixture shall be smooth and frothy and no lumps shall be detected. It is recommended that a person experienced in the preparation of *IDLIS* shall assess the results in the manner described above.

The results of grinding rice shall be assessed by diluting the ground mixture to above 10 times its original volume with clean water and sieving it successively through the following Indian Standard sieves:

1.40 mm, 1.00 mm and 500 microns

The ground material from the grinder is recovered as fully as possible by rinsing. Water is passed through the grinder while it is working, after all the quantity of rice is ground, and for a period of one minute. The water collected after rinsing shall be used for dilution.

The quantity of materials left inside the grinder after the above rinsing shall be not more than 5 percent by weight of the original quantity taken for grinding.

After sieving, the water from the material retained in each sieve shall be allowed to drain away for 5 minutes and the material shall then be recovered and weighed.

The grinder shall be considered satisfactory if not more than 5 percent of the weight of rice originally taken is retained in 1.5-mm sieve, not more than 10 percent by the 1.00-mm sieve and not more than 70 percent by the 500-microns sieve.

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